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CE

SM3300 - Interface modules

Models	Description
INT MOD M/S	Master/Slave interface SM3300
INT MOD SIM	Simulation interface
INT MOD CON	Isolated contacts interface
INT MOD SER	Multi-protocol serial interface
INT MOD DIG	Digital I/O interface
INT MOD ANA	Isolated analog interface
INT MOD ANY	Fieldbus compatible interface

General Features

- Plug and Play for the SM3300 series power supplies
- Multiple interfaces possible per power supply
- Isolated from the output voltage
  Working voltage 1000V
- Floating with respect to earth

Features INT MOD M/S

Master Slave interface

- Easy control of series or parallel operation.
- Multiple power supplies behave as one power supply.
- Mixed series and parallel is also possible

Features INT MOD SIM

Simulation interface

- High accuracy simulation
- Simulation of photovoltaic, leadless sense compensation, internal resistance and foldback current
- Custom programmable table, for simulation of complex I-V curves
- Configurable by web and GUI

Features INT MOD CON

Isolated contacts

- 4 relays with make-and-break contacts
- Additional (floating) Interlock with 24V enable system
- Programmable via Ethernet

Features INT MOD SER

Serial controller interface

- Multi protocol RS232, RS485, RS422, USB
- Web based configuration
- Speeds up to 115.2 kbps

Features INT MOD DIG

Digital (user) I/O

- 8 inputs Logic high = 2.5 … 30V, Logic low = 0V
- 8 Open Drain outputs 0 - 30V, max. 200mA
- Programmable via Ethernet or sequences

Features INT MOD ANA

Analog controller interface

- High accuracy, low drift
- 16 bit AD and DA conversion
- Compatible with other Delta Elektronika 15p analog interfaces
- Factory calibrated for optimum accuracy

Features INT MOD ANY

Fieldbus controller interface

- Compatible with a variety of HMS AnyBus modules
- Web based configuration
- High speed programming

SM3300 Interfaces Combinations

Most of the interface types can be combined with others. There are some limitations:

	INT MOD M/S	INT MOD SIM	INT MOD CON	INT MOD SER	INT MOD DIG	INT MOD ANA	INT MOD ANY
INT MOD M/S							
INT MOD SIM							
INT MOD CON							
INT MOD SER							
INT MOD DIG							
INT MOD ANA							
INT MOD ANY							

Combination allowed

Multiple interfaces of this type allowed

Combination not allowed

For the total amount per type and the allowed slots, please check the information on the corresponding interface page in this document, under “Mounting”.

https://www.elac.si/product.php?id_product=3758

Master Slave Interface - INT MOD M/S

Typical Applications

- Applications where more current or voltage is required than one power supply can deliver
- Applications where a symmetrical power supply is needed

Specifications

	SM 18-220	SM 66-AR-110	SM 100-AR-75	SM 330-AR-22	SM 660-AR-11
Max. total voltage	1000 V	1000 V	1000 V	1330 V	1330 V
Max. devices in series	8	8	8	4	2
Max. devices in parallel	8	8	8	8	8
Max. devices in system	8				
Typical additional programming time	4 ms				
Programming cable	Modular connector cable 6P6C (1 cable supplied with each interface)				
Max. cable length	0.5 m				
Safety	EN 60950 / EN 61010				
Operating Temperature	–20 to +50 °C				
Humidity	max. 95% RH, non-condensing, up to 40 °C max. 75% RH, non-condensing, up to 50 °C				
Storage temperature	–40 to +70 °C				
Mounting[1]	Pluggable, SM3300 interface slots 1, 2, 3 or slot 4.				
Compatibility	Can not be combined with INT MOD SIM				
Weight	70 g				

[1] Max 1pc INT MOD M/S per unit.

Simulation Interface - INT MOD SIM

Typical Applications

- Simulation of photovoltaic I-V curve
- Testing dynamic MPPT efficiency with EN 50530 standard
- Compensation for the voltage drop in the load leads without sense wires
- Custom I-V curve simulation through custom table
- Simulation of internal resistance
- Simulation of foldback current limit

Specifications

Photovoltaic Simulation	**SM 18-220**	**SM 66-AR-110**	**SM 100-AR-75**	**SM 330-AR-22**	**SM 660-AR-11**
Required reference parameters	Open circuit voltage ($V_{oc,stc}$), Maximum power point voltage ($V_{mpp,stc}$), Short circuit current ($I_{sc,stc}$), Maximum power point current ($I_{mpp,stc}$), Temperature at STC (T_{stc}), Irradiance at STC (G_{stc}), Temperature coefficient for the current (T_{clsc}), Temperature coefficient for the voltage (Tc_{Voc}).				
Required panel parameters	Technology (cSi or Thin Film), Temperature of the photovoltaic panel (T_{pv}), Irradiance on the photovoltaic panel (G_{pv}).				
Required parameters for dynamic efficiency test	Irradiance high level (G_{high}), Irradiance low level (Glow), Start-up time, Ramp-up time, Dwell-high time, Ramp-down time, Dwell-low time, Number of repetitions.				
Programming accuracy	± 0.2%				
Internal Resistance Max. configurable R_i	13.5 mΩ	327 mΩ	115 mΩ	1.35 Ω	5.45 Ω
Response time R_i Output Voltage (load = 0W) Output Current step Rise time (10 - 90%) Fall time (90 - 10%)	13.5 mΩ 16.5 V 20-200 A 3 ms 3 ms	54.5 mΩ 33 / 66 V 10-100 / 5-50 A 1.25 / 1.25 ms 1.25 / 1.25 ms	115 mΩ 50 / 100 V 6.6-66 / 3.3-33 A 2.25 / 2.25 ms 2.25 / 2.25 ms	1.35 Ω 165 / 330 V 2-20 / 1-10 A 2.25 / 2.25 ms 2.25 / 2.25 ms	5.45 Ω 330 / 660 V 1-10 / 0.5-5 A 2.5 / 2.25 ms 2.5 / 2.25 ms
Leadless Sense Max. configurable Ri	13.5 mΩ	54.5 mΩ	115 mΩ	1.35 Ω	5.45 Ω
Response time R_i Output Voltage (load = 0W) Output Current step Rise time (10 - 90%) Fall time (90 - 10%)	13.5 mΩ 16.5 V 20-200 A 5.5 ms 5.5 ms	54.5 mΩ 33 / 66 V 10-100 / 5-50 A 4 / 4 ms 4 / 4 ms	115 mΩ 50 / 100 V 6.6-66 / 3.3-33 A 4.25 / 4 ms 4.25 / 4 ms	1.35 Ω 165 / 330 V 2-20 / 1-10 A 5 / 5.25 ms 5 / 5.25 ms	5.45 Ω 330 / 660 V 1-10 / 0.5-5 A 5 / 4.5 ms 5 / 4.5 ms
Foldback current Parameter range I_{fold} Fold time	 0 - 101 % 0 - 100 s				
Safety	EN 60950 / EN 61010				
Operating Temperature	–20 to +50 °C				
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C				
Storage temperature	–40 to +70 °C				
Mounting[2]	Pluggable, SM3300 interface slots 2, 3 or slot 4. Interface cannot be plugged in slot 1				
Compatibility	Can not be combined with INT MOD M/S, INT MOD ANA or INT MOD ANY.				
Weight	70 g				

[2] Max 1pc INT MOD SIM per unit.

Isolated Contacts - INT MOD CON

Typical Applications

- Trigger an external safety alarm
- Interact in automated processes
- Switch the output On/Off with a remote 24Vdc signal
- Using a floating signal for triggering the Interlock function

Specifications

Relay contacts 1... 4 Contact voltage Contact current Maximum switching capacity	 60 V 2 A 60 W
Floating Interlock Open circuit voltage	 5 V
Floating Enable Nominal input voltage Input voltage range Input impedance	 24 VDC 15 - 30 VDC 12 kΩ
Insulation Prog. connectors - internal circuits Prog. connectors - earth	 1000 VDC Reinforced isolation Max. 60 VDC
Safety	EN 60950 / EN 61010
Operating Temperature	–20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	–40 to +70 °C
Mounting	Pluggable, SM3300 interface slots 1, 2, 3 and slot 4.
Programming connector	Relay 1 & 2, via a 6 pole “FK-MC 0,5/ 6-ST-2,5” connector. Relay 3 & 4, via a 6 pole “FK-MC 0,5/ 6-ST-2,5” connector. Interlock and Enable via a 3 pole “FK-MC 0,5/ 3-ST-2,5” connector. Contra connectors supplied with interface.
Weight	140 g

Serial Interface (multi-protocol) - INT MOD SER

Typical Applications

- RS232 Programming
- Balanced RS422 Programming
- USB Programming
- Balanced RS485 Bi-directional Programming

Specifications

Communication speeds (bps)	2400, 4800, 9600, 19200, 38400, 57600, 115200
Insulation Prog. connectors - internal circuits Prog. connectors - earth	 1000 VDC Reinforced isolation Max. 60 VDC
Safety	EN 60950 / EN 61010
Operating Temperature	–20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	–40 to +70 °C
Mounting	Pluggable, SM3300 interface slots 1, 2, 3 and slot 4.
Programming connector	RS422 & RS485 wires via a 4 pole FK-MC 0,5/ 4-ST-2,5 connector (contra header supplied) RS232 via 9 pole D-connector (female), USB socket type B.
Weight	140 g

Digital User I/O - INT MOD DIG

Typical Applications

- Hardware triggering of sequences
- Interaction with other equipment
- Stand-alone automation
- Safety or Alarm indications

Specifications

Logic inputs 1... 8 Input range Input impedance Load current +5V	 2 – 30 V R_{in} = 22 kΩ 100mA
Logic outputs 1 ... 8 Output type Output impedance	 Open Drain (True = 0V, False = open) 7 Ω (max 30 V / 200 mA)
Insulation Prog. connectors - internal circuits Prog. connectors - earth	 1000 VDC Reinforced isolation Max. 60 VDC
Safety	EN 60950 / EN 61010
Operating Temperature	–20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	–40 to +70 °C
Mounting	Pluggable, SM3300 interface slots 1, 2, 3 and slot 4.
Programming connector	User Outputs via 15 pole D-connector High Density (female), User Inputs via 15 pole D-connector High Density (female).
Weight	140 g

Isolated Analog Controller Interface - INT MOD ANA

Typical Applications

- Analog programming of voltage and current
- Analog monitoring of voltage and current
- Remote monitoring of the status signals: Overtemp, Limit, Powersink Overload
- Remote Shut down of the power output using a 5V signal

Specifications

Analog Programming		**CV**	**CC**
Programming inputs			
Input range		0 - 5 / 0 - 10 V	0 - 5 / 0 - 10 V [3]
Accuracy		± 0.2%	± 0.2%
Offset		– 1 ... + 1 mV (on 5 V)	– 1 ... + 1 mV (on 5 V)
Temp. coeff. offset		10 µV / °C	10 µV / °C
Input impedance		10 MΩ	10 MΩ
Monitoring output			
Output range		0 - 5 / 0 - 10 V	– 5 to + 5 V / – 10 to + 10 V
Accuracy		± 0.2%	± 0.2%
Offset		– 1 ... + 1 mV (on 5 V)	– 1 ... + 1 mV (on 5 V)
Temp. coeff. offset		3 µV / °C	60 µV / °C
Output impedance		2 Ω / max. 4 mA	2 Ω / max. 4 mA
Reference voltage			
On prog. connector	V_{ref}	5.114 ±15 mV (Ro = 2 Ω, max. 4 mA)	
	TC	20 ppm	
+12 V output	V_o	12 V ± 0.2 V	
On prog. Connector	I_{max}	0.2 A	
	R_o	5 Ω	
Status outputs			
CC - status		CC - operation	5 V = logic 1 (R_o = 500 Ω)
LIM- status		CV or CC limit	5 V = logic 1 (R_o = 500 Ω)
OT- status		Over Temperature	5 V = logic 1 (R_o = 500 Ω)
PSOL- status		Power Sink Overload	5 V = logic 1 (R_o = 500 Ω)
ACF- status		AC - Fail	5 V = logic 1 (R_o = 500 Ω)
DCF- status		DC - Fail[4]	5 V = logic 1 (R_o = 500 Ω)
Remote Shutdown		With +5 V, 1 mA or relay contact	
Insulation			
Prog. connectors - internal circuits		1000 VDC Reinforced isolation	
Prog. connectors - earth		Max. 60 VDC	
Safety		EN 60950 / EN 61010	
Operating Temperature		–20 to +50 °C	
Humidity		Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C	
Storage temperature		–40 to +70 °C	
Mounting[5]		*Pluggable, SM3300 interface slots 2, 3 or slot 4. Interface cannot be plugged in slot 1*	
Programming connector		15 pole D-connector (female)	
Compatibility		Can not be combined with INT MOD SIM or INT MOD ANY	
Weight		140 g	

[3] CC-prog input (pin3) sets both CC+ and CC- with 1 signal.
[4] V_{out} ±5% beyond set point
[5] Max. 1pc INT MOD ANA per unit.

AnyBus Module Interface - INT MOD ANY

Typical Applications

- Connecting the power supply to existing industrial fieldbus network.
- Programming of voltage and current
- Monitoring of voltage and current
- Remote monitoring of the status signals: ACF, DCF, Interlock, etc.
- Remote shutdown of the power output

Supported modules

Interface between Power Supply and Industrial Field Buses via HMS AnyBus CompactCom 40 Module:

- PROFIBUS
- PROFINET-IRT
- Ethernet/IP
- EtherCAT
- Modbus-TCP
- CANopen

NOTE: Both an INT MOD ANY and a CompactCom M40 module are required to connect a power supply to one of the above fieldbuses.

Specifications

Maximum Programming/Monitoring processing time[6,7] Ethernet/IP EtherCAT Modbus-TCP CANopen PROFIBUS PROFINET-IRT	 < 500 µs < 150 µs < 300 µs < 300 µs t.b.d. t.b.d.
Status update time	< 1ms
Insulation Prog.connectors - internal circuits Prog.connectors - earth	 1000 VDC Reinforced isolation Max. 60 VDC
Safety	EN 61010
Operating Temperature	–20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	–40 to +70 °C
Mounting[8]	Pluggable, SM3300 interface slots 2, 3 or slot 4. Interface cannot be plugged in slot 1
Compatibility	Cannot be combined with INT MOD ANA or INT MOD SIM.
Weight	140 g[9]

[6] Excluding network latency and Power Supply response times
[7] Measured using 16-bit Data Format A.
[8] Max 1pc INT MOD ANY per unit.
[9] Excluding AnyBus CompactCom 40 Module.